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Find Subject Areas: Index Categories Alpha

Show Side Menu

Search Subject Areas & Legacy Documents:

Contents: Environmental MonitoringEffective Date: **March 1999**Point of Contact: [Environmental Compliance Representative \(ECR\)](#)

Section**Overview of Content
(see section for full process)**[Introduction](#)[1. Establishing Environmental Monitoring Programs](#)

- Evaluate plans for new facilities and modifications.
- Identify potential environmental release pathway.
- Determine if monitoring is required.
- Evaluate engineering/operating controls.
- Determine environmental monitoring options.
- Prepare environmental sampling and analysis plan for facility.
- Send plan to DOE for review and approval.
- Install new monitoring devices as required.
- Report results of monitoring programs.
- Abandon, remove, or reposition an environmental sampling device when needed.
- Ensure removal or abandonment activity is properly conducted and documented.

[Definitions](#)**Exhibits**

None

Forms

None

Training Requirements and Reporting Obligations

This subject area does not contain training requirements.

This subject area may or may not contain reporting obligations. See the subject area until obligations are listed here.

References

BNL Environmental Monitoring Program Standard Operating Procedure, Installation of Groundwater Monitoring Wells (EM-SOP-102).

BNL Environmental Monitoring Program Standard Operating Procedure, Placement and Collection of TLDs (EM-

SOP-502).

BNL Groundwater Protection Management Program Description (December 23, 1998).

BNL Standard Operating Procedure EM-SOP-104, Abandonment of Groundwater Monitoring Wells, Injection Wells, and Supply Wells.

[Drinking Water](#) Subject Area

[Liquid Effluents](#) Subject Area

[Non-Radioactive Airborne Emissions](#) Subject Area

[Radioactive Airborne Emissions](#) Subject Area

[Spill Response](#) Subject Area

[Storage and Transfer of Hazardous Materials](#) Subject Area

[Underground Injection Control](#) Subject Area

Standards of Performance

All staff and guests shall comply with applicable Laboratory policies, standards, and procedures, unless a formal variance is obtained.

Managers shall analyze work for hazards, authorize work to proceed, and ensure that work is performed within established controls.

Managers shall ensure that work is planned to prevent pollution, minimize waste, and conserve resources, and that work is conducted in a cost-effective manner that eliminates or minimizes environmental impact

Management System

This subject area belongs to the **Environmental Management System** management system.

[Back to Top](#)

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SBMS	Forms	Contact List	SBMS Instructions	Help Desk
-------------	-------	--------------	-------------------	-----------

Find Subject Areas: Index Categories Alpha

Show Side Menu Search Subject Areas & Legacy Documents:

Introduction: Environmental MonitoringEffective Date: **March 1999**Point of Contact: [Environmental Compliance Representative \(ECR\)](#)

BNL has a comprehensive environmental monitoring program that includes monitoring the air, drinking water, surface water, groundwater, soil, sediment, flora, and fauna. This program is designed to provide early warning of potential environmental releases, monitor potential pathways for exposure to the public and the environment, monitor the effectiveness of environmental remediation systems, measure the potential impact BNL operations may have on the environment, and provide data to demonstrate compliance with applicable laws, regulations, and permit limits. It includes planning, implementation, and reporting activities associated with the collection and analysis of samples, or the direct measurement of environmental media, including liquid effluent monitoring, air emissions monitoring, and environmental surveillance.

Environmental monitoring is conducted primarily by two organizations, the Environmental Services Division (ESD) and the Environmental Management (EM) Directorate. The ESD conducts monitoring required by regulatory agency permits, and DOE Order 5400.1, General Environmental Protection Program. The EM Directorate conducts monitoring related to cleanup activities, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Individual facilities also conduct monitoring for air emissions and/or liquid effluents.

This subject area provides general requirements for all environmental monitoring conducted at BNL. Additional media-specific requirements are addressed in the following subject areas:

- Drinking Water
- Liquid Effluents
- Non-Radioactive Airborne Emissions
- Radioactive Airborne Emissions
- Spill Response
- Storage and Transfer of Hazardous and Nonhazardous Materials
- Underground Injection Control

[Back to Top](#)

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SBMS	Forms	Contact List	SBMS Instructions	Help Desk
-------------	-------	--------------	-------------------	-----------

Find Subject Areas: Index Categories Alpha

Show Side Menu Search Subject Areas & Legacy Documents:

Subject Area: **Environmental Monitoring**

1. Establishing Environmental Monitoring Programs

Effective Date: **March 1999**

Point of Contact: [Environmental Compliance Representative \(ECR\)](#)

Applicability

This information applies to line organizations who operate facilities that have the potential to impact environmental quality, or those with the responsibility to characterize, remediate, monitor, and report on the status of environmental quality and impacts.

Required Procedure

For assistance in complying with this procedure or for further information, contact the [Environmental Compliance Representative \(ECR\)](#) for your department. Additional assistance may be obtained from the [Environmental Subject Matter Expert \(SME\)](#) who is the lead for the media involved (i.e., air, surface water, groundwater, or radiation). For information on specific environmental monitoring requirements, see the [Drinking Water](#), [Liquid Effluents](#), [Non-Radioactive Air Emissions](#), [Radioactive Air Emissions](#), [Spill Response](#), [Storage and Transfer of Hazardous and Nonhazardous Materials](#), and [Underground Injection Control](#) Subject Areas.

Note: For the Environmental Restoration (CERCLA) Program, the Environmental Management (EM) Directorate may use Environmental Management (EM) Directorate SMEs or contractor support to determine monitoring requirements, assess potential impacts, develop plans, install monitoring equipment, and to implement associated monitoring programs.

Step 1	<p>The Line Manager or designee evaluates plans for all new facilities, and any modifications to existing facilities or operations to identify potential impacts to the environment and the need for environmental monitoring.</p> <p>Note: The necessity for new monitoring programs may be identified using the following criteria:</p> <ul style="list-style-type: none"> • historical data review; • Facility Reviews; • Process Evaluation Project (PEP); • CERCLA; • Environmental Management System implementation; • new facilities or operations; or • modifications to facilities or operations.
Step 2	<p>When a potential environmental release pathway has been identified, the Line Manager or designee notifies their Environmental Compliance Representative (ECR).</p> <p>The ECR and the Environmental SME who is the lead for the media involved (i.e., air, surface</p>

	<p>water, groundwater, or radiation) determine if environmental monitoring is required in order to demonstrate compliance with applicable environmental laws and regulations (including Federal, State, and local environmental regulations, DOE Orders, and other requirements).</p> <p>Note: If there is a clear indication that there has been an unexpected release to the environment (i.e., a surface spill or leak from a pipeline or storage facility), follow the procedures in the section Notification and Response Requirements for Unexpected Releases of Oil, Hazardous Substances, or Radioactive Materials in the Spill Response Subject Area.</p>
Step 3	<p>The Line Manager or designee provides the following information to the ECR in order to evaluate engineering and/or operating controls, and to determine environmental monitoring options:</p> <ul style="list-style-type: none"> • Process description, and duration of the project; • Assessment of potential environmental impacts and release pathways (i.e., soil activation, leakage, etc.); • Assessment of potential contaminant concentration in soils, the ability of contaminant to leach out of soils and into groundwater, and the estimated concentration in groundwater. Process knowledge or computer simulations (models) may be used when describing the types and amounts of chemical and radionuclide contaminant concentrations. <p>Note: This information must be provided as early as possible in the process/project design to ensure that the time is available to carefully assess the potential impact, and make necessary notifications to DOE and possibly to regulatory agencies. Early planning is also required to ensure that funding is identified for the timely construction/installation of necessary engineering controls, the installation of monitoring devices, conduct of pre-operational monitoring, and long-term monitoring. Contact the Environmental Compliance Representative (ECR) for assistance.</p>
Step 4	<p>The ECR and the Environmental SME review the information and determine if an environmental monitoring program is required. If monitoring is required, the Environmental SME prepares an environmental sampling and analysis plan for the facility. The Environmental SME incorporates the new monitoring program into the annual update to the BNL Environmental Monitoring Plan, as needed.</p> <p>The sampling and analysis plan will include required pre-operational and operational monitoring procedures to satisfy DOE and/or regulatory requirements. The plan will also provide an overview of the monitoring program's Data Quality Objectives (DQOs). The DQOs include an assessment of the sampling and analysis objectives, monitoring frequency, required analyses, quality assurance requirements, and data management and reporting requirements. The plan must also include an estimate of costs associated with the sampling and analysis program, and the identification of funding sources.</p> <p>Note: See the Drinking Water, Liquid Effluents, Non-Radioactive Air Emissions, Radioactive Air Emissions, Spill Response, Storage and Transfer of Hazardous and Nonhazardous Materials, and Underground Injection Control Subject Areas for more information.</p>
Step 5	<p>When necessary, the Environmental SME sends the sampling and analysis plan to DOE for review. If required, the Environmental SME requests approval from DOE. Upon approval, the Environmental SME forwards written authorization and documentation to the line organization.</p>
Step 6	<p>As required, the Line Manager and the Environmental SME arrange for the installation of the new monitoring devices (e.g., monitoring wells, thermoluminescent dosimeters, liquid effluent sampling devices). The Environmental Services Division (ESD) SME incorporates the new monitoring requirements into the ongoing BNL Environmental Monitoring Program (EMP). The Environmental SME notifies the Line Manager when required sampling equipment has been installed, and of the sampling schedule for the monitoring program.</p> <p>The EM Directorate SME incorporates new CERCLA monitoring requirements into the BNL Environmental Monitoring Program, and coordinates sample collection within the Environmental Management (EM) Directorate organization.</p>

Step 7	The Line Manager incorporates/describes potential environmental impacts, engineering controls, and sampling and analysis requirements in the facility's Safety Analysis Reports, Safety Assessment Documents, and Facility Use Agreement, as needed.
Step 8	<p>The Environmental SME reports the results of the facility-specific (non-CERCLA) monitoring program:</p> <ul style="list-style-type: none"> • To the line organization on a semiannual or annual basis (depending upon the sampling schedule); • To DOE and regulatory agencies (as required); • In the Annual Site Environmental Report. <p>The EM Directorate SME reports the results of the CERCLA monitoring program:</p> <ul style="list-style-type: none"> • To DOE and regulatory agencies; • In the Annual Site Environmental Report.
Step 9	<p>If the need arises to abandon, remove, or reposition an environmental sampling device, contact the Environmental Compliance Representative (ECR). The ECR will inform the Environmental SME.</p> <p>For example, a Line Manager may request the removal, abandonment (i.e., abandoning a well in place), or repositioning of a sampling device if the position of the device interferes with a current or planned work activity (i.e., construction of a new building). Removal or abandonment of sampling devices may also be necessary when the monitoring program is no longer required.</p> <p>If the monitoring devices are related to a facility-specific monitoring program (non-CERCLA), the Line Manager or designee contacts the Environmental Services Division. If the monitoring devices are related to the Environmental Restoration Program (CERCLA), the Environmental SME notifies the Environmental Management (EM) Directorate.</p>
Step 10	If the device is part of a monitoring program required by an active regulatory permit or commitment under the Laboratory's Environmental Restoration Program, the Environmental SME first obtains written authorization from DOE and applicable regulatory agencies.
Step 11	Upon DOE and regulatory agency approval, the ESD SME or EM Directorate SME, as applicable, provides the line organization with written authorization for removal, abandonment or repositioning of the sampling device.
Step 12	The ESD SME or EM Directorate SME, as applicable, works with the appropriate line organization to determine costs, develop required implementation plans and specifications, and ensure that the removal or abandonment activity is properly conducted and documented.

Guidelines

The data quality objectives and effectiveness of environmental monitoring programs should be periodically re-evaluated by the line organizations and the Subject Matter Experts (SMEs) to ensure that the programs are appropriate, cost-effective, and remain in compliance with regulations (i.e., operating permits) or DOE monitoring requirements.

Managers should adopt cost-effective practices that eliminate or reduce environmental impacts resulting from their operations. This includes implementing operational controls and waste minimization practices, and installing and maintaining pollution prevention devices.

Line organizations should review monitoring reports pertaining to their facilities (e.g., Site Environmental Report, Facility Environmental Monitoring Report, and reports to regulatory agencies). Line organizations should provide feedback to the SMEs on the scope, completeness, and accuracy of the reports.

References

[Drinking Water](#) Subject Area

[Liquid Effluents](#) Subject Area

[Non-Radioactive Air Emissions](#) Subject Area

[Radioactive Airborne Emissions](#) Subject Area

[Spill Response](#) Subject Area

[Storage and Transfer of Hazardous and Nonhazardous Materials](#) Subject Area


[Underground Injection Control](#) Subject Area

[Back to Top](#)

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Definitions: Environmental MonitoringEffective Date: **March 1999**Point of Contact: [Environmental Subject Matter Expert \(SME\)](#)

Term	Definition
drinking water	Water suitable for human consumption (also known as potable water).
environmental monitoring	Sample collection and analysis of environmental media (i.e., air, groundwater, drinking water, soil, sediment, flora, and fauna) for the purpose of assessing the impacts, if any, of operations on environment, and to demonstrate compliance with applicable environmental requirements.
line manager	Chairperson or Manager (Level 3) of a BNL Department or Division.
monitoring well	Any test hole that is bored, drilled, or driven that is intended for the acquisition of groundwater measurements or samples.
permit	An authorization, license or equivalent document issued by the U.S. Environmental Protection Agency (EPA), New York State Department of Environmental Conservation (NYSDEC), or Suffolk County Department of Health Services (SCDHS). A permit may contain specific requirements for environmental surveillance or effluent monitoring.
SME	Subject Matter Expert (e.g., Hydrogeologist, Environmental Engineer, Health Physicist, etc.).
TLD	A TLD, Thermoluminescent Dosimeter, is used to measure cumulative radiation exposure.
underground source of drinking water	An aquifer that contains a sufficient quality and quantity of water to supply a public water system.

[Back to Top](#)

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SBMS	Forms	Contact List	SBMS Instructions	Help Desk
-------------	-----------------------	------------------------------	-----------------------------------	---------------------------

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Revision History: Environmental Monitoring

Point of Contact: [Environmental Subject Matter Expert](#)

Revision History of this Subject Area

Date	Description	Management System
March 1999	This is a new subject area.	Environmental Management System

[Back to Top](#)

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